

ASSESSMENT OF THE MICROBIAL COMMUNITIES AND THEIR PETROLEUM HYDROCARBON TRANSFORMATION POTENTIAL IN THE NORTHERN CASPIAN SEA

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Introduction. Marine bacterial biodiversity is an immense library of tools which have a potential in bioremediation of oil spills [1]. Oil industry is flourishing in the Caspian Sea which is effecting local environment and we hypothesize that natural seeps and historical anthropogenic leaks have sustained indigenous microbial communities, including hydrocarbon-oxidizing microorganisms (Picture 1). Indigenous microbial communities of Northern part of the Sea and their overall metabolic potential have not been studied comprehensively. We aim to gain knowledge about the bacterial community, determine specific hydrocarbon degrading species and study their potential in bioremediation of oil-polluted Caspian Sea waters.

Materials and methods. We have collected marine water samples and cultivated number of different microorganisms using standard microbiological procedures. Molecular methods such as identification of colonies using PCR with subsequent sequencing is performed and isolated strains are tested for their ability to degrade hydrocarbon contaminants using EcoLog multi-substrate assays. For better assessment of the community, a phylogenetic tree will be generated based on 16S rRNA of water samples. PhyloChip Microarray technology will be used for abundance comparison of specific strains.

Results and discussion. 121 different colonies have been obtained by microbiological methods and they are currently being identified. Meanwhile, preparation for molecular work such as amplification of 16S rRNA, phylogenetic tree construction and analysis of microarray data is ongoing.

Conclusions. Characterization of representative environmental samples and determination of structure and function of the indigenous microbial assemblages within will result in new scholarly knowledge; and isolated strains can be used for preparation of an oil spill cleanup product which may be used at the times of oil spillage at the Caspian sea as well as a cleanup procedure on a regular basis to eliminate accumulation of toxic compounds in the environment.

References.

1. Zhanfei L., Jiqing L. (2013) Evaluating bacterial community structures in oil collected from the sea surface and sediment in the northern Gulf of Mexico after the *Deepwater Horizon* oil spill. *Microbiologyopen*. 2(3): 492-504.



Picture 1. Oil exploration sites in the Caspian Sea